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Publication date:
2005

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):
Curiotto, S., Pryds, N., Johnson, E., & Battezzati, L. (2005). *Undercooling and demixing of copper-based alloys*. Abstract from 3rd Annual Meeting in the Copenhagen Graduate School for Nanoscience and Nanotechnology, Copenhagen, Denmark.

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Undercooling and Demixing of Copper-based Alloys

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ABSTRACT

Immiscible alloys have been subject to microgravity experiments since the beginning of materials science research under microgravity due to the fascinating prospect of producing fine dispersed materials for various applications. Containerless processing and rapid solidification offer new possibilities to investigate the properties of such systems. The aim of the work is to study a variety of physical phenomena, including wetting, phase separation and solidification. Of particular interest are the binary alloys Cu-Co and Cu-Fe, and the ternary system Cu-Fe-Co. All of them show a metastable miscibility gap in the regime of the undercooled melt. This paper discusses the progress made in the Microgravity Application Programme “CoolCop”, financed by the European Space Agency.